BAGGING OF COMPRESSIBLE BULK MATERIAL

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to bulk shipping. More particularly, the invention pertains to a method for palletizing peat moss or the like in bulk compressed form as well as to the palletized product obtained thereby.

Description of the Prior Art

[0002] Owing to its unique porous structure, peat moss can absorb from about 8 to about 20 times its weight in water. Such a high absorption capacity renders peat moss particularly suitable for use in absorbent products such as diapers, sanitary napkins, tampons and the like. Peat moss is also widely used in horticulture as soil adduct, compost, culture base, etc.

[0003] Peat moss is generally packaged in plastic bags for shipment. A typical apparatus for packaging peat moss into bags is described in Canadian Patent No. 1,043,310. The volume of a bag filled with compressed peat moss is usually not larger than about 0.17 cubic meters in order to facilitate handling and shipping. Thus, a single shipment of peat moss may comprise thousands of such bags. The quantity of plastic bags utilized for packaging, and discarded after use, is of course phenomenal and represents a serious threat to the environment.

[0004] On the other hand, bulk shipping of peat moss in large containers must be effected rapidly since a prolonged exposure of peat moss to atmospheric oxygen causes a bacterial decomposition of the peat moss. U.S. Patents No. 5,477,658 and 5,699,915 issued to Berger et al. disclose palletized peat moss in bulk compressed form, wherein the peat moss is enveloped in a plastic wrap. However, plastic wrap creates several joints between adjacent plastic layers, which makes it difficult to obtain a sealed package. Although using less plastic than standard small packages, wrapping in bulk still necessitates a considerable quantity of plastic, increasing production costs.

[0005] U.S. Patents No. 3,961,459 to Wolske, No. 3,902,303 to King, and 3,621,638 to Grocke, all discloses machines and methods for packaging palletized loads using stretched plastic bags. However, these machines and methods are adapted for rigid loads, such as boxes, and are thus not adequate for compressible material such as peat moss.

SUMMARY OF THE INVENTION

[0006] It is therefore an aim of the present invention to provide improved palletized peat moss in bulk compressed form.

[0007] Therefore, in accordance with the present invention, there is provided a method for bagging compressible particle material in bulk compressed form, the method comprising the steps of providing a compressed quantity of free standing compressible particle material on a base, the compressed particle material forming a body holding a desired shape for a period of time sufficient to permit bagging, providing a bagging apparatus with a stretchable bag, the bag having an open mouth, a mouth perimeter being smaller than a body perimeter and smaller than a base perimeter when the bag is in a relaxed state, using the bagging apparatus to stretch the bag and the mouth so that the mouth perimeter becomes larger than the body perimeter and larger than the base perimeter, progressively enclosing the body in the bag through the open mouth until the body and at least a top part of the base are contained within the bag, and releasing the bag so that a sufficient memory of the bag allows the bag to provide a compressive force on the at least top part of the base and body, the body being sealed in an enclosure formed by the base and bag.

[0008] Also in accordance with the present invention, there is provided a pack of compressible particle material comprising a base, a body of compressed particle material in bulk form upstanding freely from the base and compressed directly thereon, and a bag enclosing the body and producing a compressive force thereon so as to retain the compressed particle material in bulk compressed form on the base, the bag and base defining an enclosure completely enclosing the body with the enclosure having a bottom constituted by the base.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Reference will now be made to the accompanying drawings, showing by way of illustration a preferred embodiment thereof and in which:

[00010] Fig.1 is a side elevational view of palletized peat moss according to a preferred embodiment of the present invention;

[00011] Fig.2 is a perspective view of a apparatus for palletizing peat moss according to a preferred embodiment of the present invention;

[00012] Fig.3 is a side elevational view of the palletized peat moss of Fig.1 prior to bagging;

[00013] Fig.4 is a bottom plan view of a bag, illustrated in relaxed and stretched form, before placing of the bag on the peat moss of Fig.3;

[00014] Fig.5 is a side elevational view of the palletized peat moss of Fig.1 during bagging;

[00015] Fig.6 is a side elevational view of the palletized peat moss of Fig.1 at the end of the bagging operation;

[00016] Fig.7 is a block diagram schematically illustrating a method of palletizing peat moss according to the preferred embodiment of the invention; and

[00017] Fig.8 is a block diagram schematically detailing the bagging step of the method of Fig.7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00018] In the present invention, Sphagnum peat moss optionally in admixture with mineral or organic aggregates is used as feedstock. The peat moss should have a water-content ranging from about 25 to about 50 weight % and a density ranging from about 0.05 to about 0.15 gm/cc on dry basis. If the water-content is too low, it is adjusted to the desired content by adding water, for example, by means of water sprays.

[00019] The peat moss is batch fed to a compression unit for direct compression on a pallet. A predetermined quantity of peat moss is held stacked vertically on the pallet to confine the peat moss to a desired, compressed shape. The peat moss is compressed downwardly onto the pallet at a pressure ranging from about 3 to about 5 kg/cm^2 so as to form the peat moss into a coherent, shaped-retaining

body without substantially altering the water-content and intrinsic properties of the peat moss. If desired, an additional quantity of peat moss is fed to the compression unit and compressed to increase the amount of peat moss compressed on the pallet. The steps of peat moss feeding and compressing may be repeated several times, although a single compression stroke is preferred. The body of compressed peat moss is then enveloped by a plastic film bag to retain the peat moss in compressed form on the pallet.

[00020] As seen in Fig.1, the palletized peat moss generally designated by reference numeral 10 comprises a body of compressed peat moss 12 upstanding from a pallet 14 and enveloped by a plastic bag 16, the plastic bag retaining the peat moss 12 in compressed form on the pallet 14. The pallet 14 is a conventional wooden pallet comprising a top deck board fixed to three stingers arranged in spaced-apart parallel relationship to one another, each stringer being formed with three legs and aligned legs of the stringers being interconnected by transverse slats. Typically, the palletized peat moss 10 has a rectangular cross-section with a width of about 1.0 meter and a length of 1.2 meters, the height ranging from about 2.0 to about 2.5 meters. The volume of compressed peat moss retained on the pallet generally ranges from about 2.5 to about 3.2 cubic meters.

[00021] The compression of the peat moss on the pallet so as to form a shape-retaining body is done according to U.S. Patents No. 5,477,658 and 5,699,915 previously mentioned and incorporated herein by reference. The compression process will be briefly explained herein below.

[00022] Referring to Figs.2 and 7, peat moss contained in a primary reservoir 20 is unloaded into a secondary reservoir 22 until a desire quantity is reached. Meanwhile, a housing is opened and a pallet 14, preferably covered by a cardboard or plastic sheet, is inserted within the open housing. The housing is then closed and placed in a compacting station 24. While the housing can have a number of different shapes, it is preferably prismatic. The pallet 14 closes a bottom end of the housing. Since compressed peat moss has a tendency to expand, it is necessary to have a pallet with a top surface cross-sectional area larger than the cross-sectional area of the body of the compressed peat moss, to prevent the peat moss from running the edges of the

pallet when it expands. Thus, the bottom part of the housing receiving the pallet 14 must be larger than the rest of the housing receiving the peat moss.

[00023] Through a conveyor, the secondary reservoir 22 empties into the compacting station 24 where the peat moss is received in the housing through an open top end thereof. Fork arms extend under the pallet so as to reinforce it during compaction. When the desired quantity of peat moss is transferred into the housing, a piston and cylinder operate to push a ram head downwardly into the housing to compress the peat moss. After the compression stroke, the ram head is raised. The housing is moved from the compacting station 24, where it is opened and then returned to the compacting station 24, thereby exposing the pallet supporting the shape-retaining body of compressed peat moss behind.

[00024] The steps of the bagging process are generally illustrated in Fig.8. Referring to Fig.3, the compressed peat moss body 12 on the pallet 14 is placed in a bagging apparatus (indicated at 26 in Fig.2). A plurality of arms 40, preferably one for each of the four corners of the pallet 14, hold a bag 16 directly over the peat moss body 12. The bag 16 is formed from a plastic tube sealed at a top end thereof with an open bottom end forming a bag mouth 18 which is aligned with the peat moss body 12. In a relaxed state, the bag mouth 18 has a perimeter which is smaller than a perimeter of the peat moss body 12 and of the pallet 14. A support 42 is engaged with the bottom of the pallet 14.

[00025] Referring to Fig.4, the arms 40 then diagonally stretch the bag 16 from a relaxed state, indicated in phantom lines, to obtain a stretched bag 16'. The stretched bag 16' defines a stretched bag mouth 18' which has a larger perimeter than the perimeter of the peat moss body 12 and of the pallet 14.

[00026] Referring to Fig.5, the arms 40 lower the stretched bag 16' onto the peat moss body 12. As the stretched bag 16' is progressively released from the arms 40, it regains at least partially its original size 16, with a perimeter smaller than the perimeter of the peat moss body 12, and thus compresses it.

[00027] Referring to Fig.6, before the arms 40 reach the pallet 14, a piston 44 pushes the support 42 to lift the pallet 14 from the ground to allow the arms 40 to place the stretched bag 16' over a top part of the pallet 14. The arms 40 then release

the stretched bag 16' which regains at least partially its original size 16, and the pallet is brought back down. The bag 16 thus compresses the peat moss body 12 and the top part of the pallet 14, and thus forms with the pallet 14 an enclosure surrounding the peat moss body 12 and maintaining it in a compressed state to form palletized peat moss 10, as shown in Fig.1.

[00028] Because the peat moss is highly compressible, standard plastic bags used with solid palletized loads are usually not appropriate to form the bag 16. The memory of the plastic, i.e. its capacity to return to its initial shape after deformation, must be sufficient to maintain the peat moss in compression. This is usually not the case in plastic bags used with solid palletized load where the compression force applied by the bag is significantly smaller. Also, the transition from a solid pallet to a soft body of compressed peat moss forms a stress concentration on the bag along that transition, especially around the corners of the pallet. The plastic used thus has to be sufficiently resistant to tearing, typically twice as much as standard plastic used with solid palletized loads, to preserve the integrity of the enclosure protecting the palletized peat moss.

[00029] The palletized peat moss 10 contained within a bag 16 presents several advantages over a similar palletized peat moss wrapped in plastic film. First, the elimination of the numerous joints between adjacent plastic layers greatly improves the sealing of the peat moss, thereby improving the shelf life of the packed product. Also, the bag 16 necessitates less plastic material than a wrap, thus reducing the cost of producing the palletized peat moss and the impact of the discarded packaging material on the environment. Bagging implies a single downward motion, while wrapping necessitated several turns around the peat moss body; the bagging process thus takes less time, increasing production. Finally, the appearance of the bagged pallet of peat moss is more esthetically pleasing than a similar wrapped pallet of peat moss.

[00030] While the present process has been described with respect to peat moss, it could be applied to a number of granular or small particle materials that can be compressed such as to form a free-standing body. The pallet could also be replaced by any other appropriate rigid base.

[00031] The embodiments of the invention described above are intended to be exemplary. Those skilled in the art will therefore appreciate that the forgoing description is illustrative only, and that various alternatives and modifications can be devised without departing from the spirit of the present invention. Accordingly, the present is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.